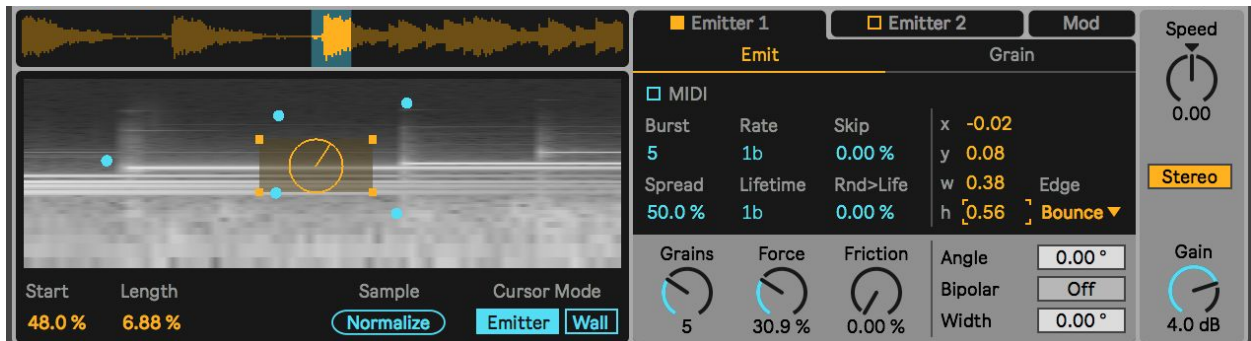# Emit User Manual

Emit is a Max for Live granular looper that uses a phase vocoder playback method and features a spectrogram display. A phase vocoder is a frequency domain playback method that allows for playback speed and pitch to be independent of each other. Because it requires a higher resolution FFT, this playback method consumes considerably more CPU than standard sample playback. Emit features a particle system that emits particles that move across the spectrogram display. The emitter is represented by a yellow/orange circle and the particles are blue circles. Each particle represents a grain or voice of the sample playback. Wherever the particle resides on the spectrogram determines the point of the sample that is played back (horizontal position) as well as the filtering or panning (Vertical position).
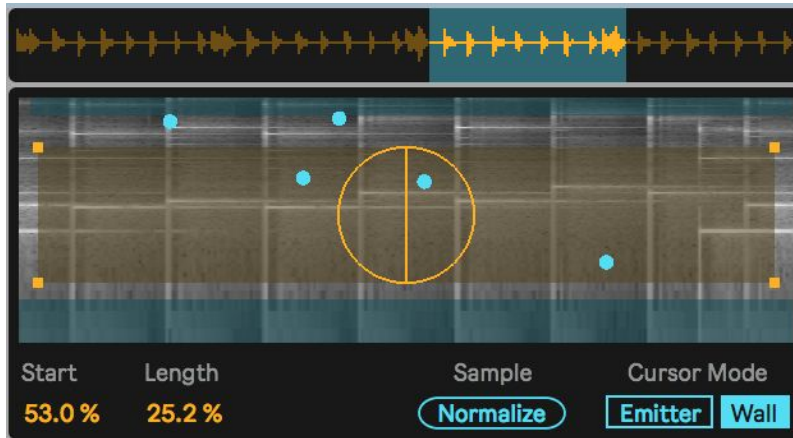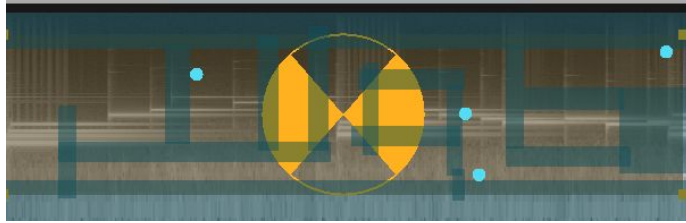

At the top of this central display is the range of the sample to be used for playback. This can also be set by the **Start** and **Length** parameters at the bottom left. In the center are the spectrogram and particle display. The emitter is both the yellow/orange circle as well as the yellow/orange rectangle surrounding it. The rectangle determines the area in which the emitter can create particles. The line or colored pie slice within the circle determines the direction the particle can move in after it is emitted. This can be in a single, polar direction like the emitter to the right in this picture on the right. Or the direction can be in a range and bipolar like the emitter on the left in the same picture. If the

direction is a range, it means that the particle will randomly move in one of the directions within that range. At the bottom, there is an option to change the **Cursor Mode**. If set on **Emitter**, the mouse will affect the selected emitter. If the shift key *is not* pressed, then dragging the center of

the emitter will move the entire emitter, while dragging the corners will resize the area of the emitter. If the shift key *is* pressed, then dragging the center of the emitter changes the width of its direction range, while dragging the corners rotates its direction. When **Cursor Mode** is set to

Walls, then walls can be created or edited with the mouse. Walls appear as transparent blue rectangles, and particles will bounce off of them. You can create a wall by dragging on an empty space, delta a wall by double-clicking it, move a wall by dragging its center and resize a wall by dragging its corner.

To the right of the main display are tabs for the parameters of the two emitters, as well as a menu for modulation.


The Emitter tabs have two additional tabs: one for the **Emit** and particle system parameters, and one for the audio **Grain** parameters.
In the top left of the **Emit** tab, there are parameters for creating and destroying particles. The emitter emits new particles at regular intervals set by **Rate**. **Burst** sets how many particles are created over the course of the interval. If **Spread** is at 0% all of the particles are emitted at the beginning of the interval, while if it is at 100%, the particles will emit at equal intervals over the **Rate** interval. **Skip** sets the probability that the emitter won't emit particles at a given interval. **Lifetime** sets the note interval that particles exist for and **Rnd>Life** adds random variety to that.

Particles are emitted automatically according to these parameters when Live's transport is running. However, if **MIDI** Mode is enabled, then particles are emitted by received MIDI notes instead, turning the device into more of a polyphonic sampler. When **MIDI** Mode is on, a volume envelope appears as well as an option for tuning the sample playback according to the received MIDI notes (**MIDI Note Pitch**).
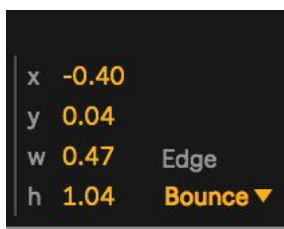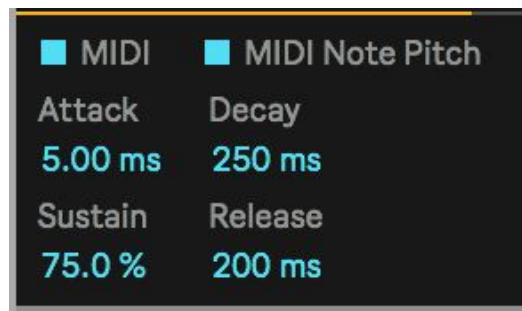
On the right side of the menu are positioning parameters for the emitter. These can also be edited with the mouse as described before, however, these boxes allow for precise editing and mapping. **Edge** determines the behavior if a particle hits the edge of the 2D area. There is an option for the particle to **Bounce**, **Wrap** around, or get **Deleted**.

At the bottom of this tab, there is an option for the maximum number of **Grains** or voices that the emitter can create at once. **Force** sets the amount of force that the emitter applies to a particle after it is emitted. Since the particles will play whatever part of the sample they are on top of, then **Force** can affect the playback speed or stretching of the sample as well as the filter or panning modulation rate. If **Force** is at 0%, a particle will freeze where it is created. **Friction** slows down a particle over time, which is useful for creating a dynamic playback rate or other effects. The **Angle** and **Width** of the emission direction can also be controlled by the mouse as described before, but here we can the values so they may be mapped. **Bipolar** sets if the emission direction could be sent in either 180-degree rotations of the **Angle** (for example, this picture shows an emitter with **Bipolar** enabled).
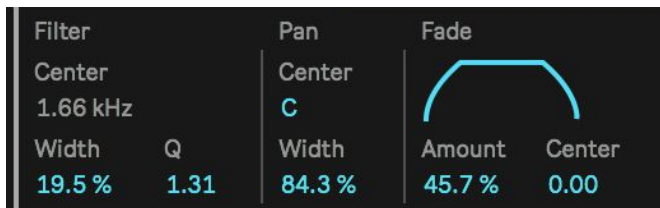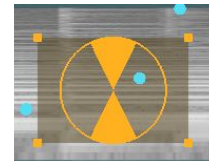
In the **Grain** tab are audio parameters for the sample playback. Each grain or particle has a set of lopass and hipass filters. The **Filter Width** parameter sets the distance between the cutoffs of the two filters (At 100% **Width**, no filtering occurs). By default, the vertical position controls the center cutoff frequency of the two filters to correspond to its position on the spectrogram. If the particle behaves like this, then the **Filter Center** parameter is disabled, as it is determined by the particle's position. However, if the **Y-Axis** Mode (shown below) is switched to **Pan** instead of **Filter**, then the particle's vertical position controls the panning instead, and in that case, the **Filter Center** is set manually. Each time a particle or grain is created, its panning is randomized (unless **Y-Axis** Mode is set to **Pan**) and the **Pan Width** attenuates the width of the random panning. **Fade** sets the volume envelope for the grain over the course of its emitted lifetime. **Amount** sets the depth of the fade, and **Center** sets the peak or its shape (to the left is ramp-down, middle is triangle, right is ramp-up).
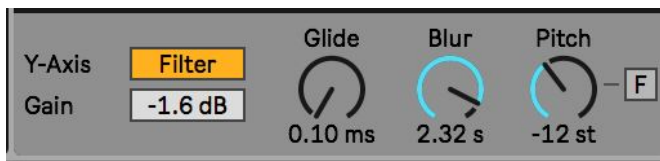
At the bottom of the Grain menu, **Glide** controls the gliding time for a grain's playback position as the particle moves across the spectrogram. **Blur** is a cheap spectral blur applied to the whole signal of the emitter. **Pitch** allows for transposition of the pitch without affecting playback speed.
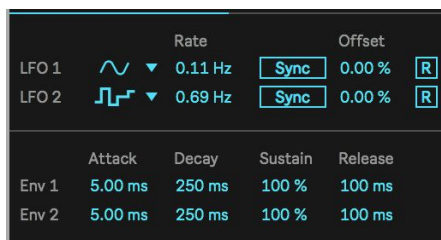
The modulation tab has two tabs for the modulation **Sources** and their **Routing** to audio parameters. In **Sources**, there are two LFOs with a retrigger option (**R**) for when MIDI notes are received. Additionally, there are two ADSR envelopes that correspond to MIDI notes.

In the **Routing** section are dropdown menus to map modulation sources and MIDI note values to different audio parameters. Each source has two possible destinations it can go to as well as an attenuator for each destination.

	Dest A			Dest B		
LFO 1	E1Force	▼	11.0 %	Off	▼	0.00 %
LFO 2	Off	▼	0.00 %	E1FiltBw	▼	17.3 %
Env 1	Off	▼	0.00 %	Off	▼	0.00 %
Env 2	Off	▼	0.00 %	Off	▼	0.00 %
Vel	Off	▼	0.00 %	Off	▼	0.00 %
Key	Off	▼	0.00 %	Off	▼	0.00 %

Speed

0.00

Stereo

Gain

0.0 dB

To the far right of the device are a few main parameters. **Speed** scales the speed of the particle simulation as well as the emitter rate and particle lifetime. If **Stereo** is enabled, then stereo samples will receive independent sample playback and filtering for each channel. **Gain** controls the volume of the entire device.